Amendments to the Drawings:

The attached sheet of drawings includes changes to Fig. 4. This sheet, which includes Fig. 1-2, replaces the original sheet including Fig. 4. In Figure 4, the second reference numeral 433 has been replaced with reference numeral 435.

Attachment:: Replacement Sheet

Annotated Sheet Showing Changes

REMARKS

This Response to Office Action is being submitted in response to the Office action mailed on October 5, 2005 in Serial No. 10/677,999.

In the Office action, the drawings are objected to as failing to comply with 37 C.F.R. 1.84(p)(4) because reference character "433" has been used to designate both a capacitor and a diode in Figure 4. Both Fig. 4 and paragraph [0019] have been amended to change the second instance of reference character "433" for the diode to reference character "435".

The Examiner objected to the disclosure because on page 2, line 1, "transmission based output from the ...." does not make sense and should be changed to "transmission based on the output from the...". Appropriate corrections to paragraph [0004] have been made. On page 3, line 7, page 4, line 14, page 5, line 8 "Vacuum is listed as 100 and should be 10. Corrections have been made to paragraphs [0014], [0016] and [0017]. On page 3, line 16, the freely rotating support wheel 106 is shown in the drawing as 6 not 106. Corrections have been made to paragraph [0014]. On page 6, lines 4 and 6, numeral "433" is used to designate both a capacitor and a diode. Appropriate corrections have been made to paragraph [0019]. On page 8, line 28, "anmddetect" is a typo. Appropriate corrections have been made to paragraph [0025].

The claims were objected to because in claim 3, line 23 "sensor to cause to said propulsion..." should be changed to "sensor to cause said propulsion....". Appropriate corrections have been made to claim 3. In claim 4, line 29, "propulsion drive motor is follows" should be changed to "propulsion drive motor follows...". Claim 4 was canceled. In claim 5,

line 2 and claim 6, line 6, "predetermined characteristic is a based upon..." should be changed to"...predetermined characteristic is based upon....". Appropriate corrections have been made to claims 2 and 6. In claim 14, line 8 and claim 15, line 12 "predetermined characteristic is a based upon..." should be changed to "predetermined characteristic is based upon ....". Appropriate corrections have been made to claims 14 and 15.

Claim 9 is objected to under 37 C.F.R. 1.75(c), as being of improper dependent form for not referring back to a preceding claim. Claim 9 was amended to depend from claim 7.

The Examiner rejected claims 1-3, and 7 under 35 U.S.C.102(e) as being anticipated by Conner et al. (Pub. No. US 2004/0135537). According to the Examiner, Conner et al. discloses a self-propelled appliance, such as a vacuum cleaner, which includes a magnetic field sensor and magnet. Specifically, according to the Examiner, claim 1 has a programmable control arrangement for a self-propelled floor care appliance comprising: a self-propelled floor care appliance having a propulsion means for propelling the floor care appliance over a surface to be cleaned (Page 2, paragraph 33), a hall effect sensor positioned in an operative relationship with a handle located on the distal end of an upper housing of said floor care appliance to sense the desired direction and speed of the floor care appliance from the user and provide a corresponding output (Page 3, paragraph 36), a programmable microprocessor to receive the output from the device for outputting a signal according to pre-programmed logic (Page 1, paragraph 5; page 5, paragraph 57), a controller for receiving the signal and providing a voltage to a propulsion means at a corresponding voltage and polarity (Page 5, paragraph 60). Applicant has merged the limitations of claim 4 into base claim 1 making base claim 1 and all remaining dependent

claims allowable. Claim 4 is hereby canceled. The allowability of claim 4 is discussed in detail below.

In regards to claim 2, according to the Examiner, the hall effect sensor outputs a voltage of varying magnitude based upon the position of the hall effect sensor relative to a magnet embedded in the floor care appliance handle (Page 5, paragraph 59). Applicant submits that the rejection of claim 2 is moot since it depends from base claim 1 which is allowable for at least the reasons set forth above and below.

In regards to claim 3, the floor care appliance handle is pushed and pulled by the user to cause the magnet embedded in the handle to move relative to the hall effect sensor to cause the propulsion means to propel the floor care appliance in the forward and reverse direction (Page 5-6, paragraphs 59-60). Applicant submits that the rejection of claim 3 is moot for at least the reason it depends from base claim 1 which is allowable for the reasons set forth above and below.

In regards to claim 7, according to the Examiner, claim 7 requires at the very least, a programmable control arrangement for a self-propelled floor care appliance, comprising: a handle at the distal end of the upper portion of the floor care appliance capable of translating from a neutral position to a forward and reverse position by a user applying a pushing or pulling movement of a varying magnitude amount on the handle (page 5-6, paragraphs 59-61), propulsion means for propelling the floor care appliance over a surface to be cleaned (Page 2, paragraph 33), a magnet located adjacent to the handle (See Figure 2, component 222), a hall effect sensor mounted in the handle and positioned in an operative relationship with a magnet, the hall effect sensor generating a voltage of varying magnitude according to the

relative position of the hall effect sensor to the magnet as the handle is moved from the neutral position to the forward and reverse positions (Figure 2, component 224; page 5-6, paragraphs 59-61), a programmable microprocessor for receiving the varying voltage from the hall effect sensor for outputting a signal according to pre-programmed logic based upon the magnitude of the voltage (Page 5, paragraph 57), and an H-bridge controller for controlling the flow of current and voltage applied to the propulsion means based upon the signal from the microprocessor (Page 5, paragraph 55). However, with all due respect to the Examiner, the Conner et al. publication (2004/0135537) does not disclose an H-bridge controller for controlling the flow of current and voltage applied to the propulsion drive motor based upon the signal from the microprocessor. A standard H-bridge controller in combination with a microprocessor or otherwise is not capable of driving the brushless DC motor as disclosed in Conner et al. and specifically in paragraph [0005] of Conner et al. A brushless DC motor requires a more sophisticated controller with the use of a microprocessor or otherwise to provide the necessary current and voltage to commutate the motor. An H-bridge controller simply would not work. Thus, for at least these reasons, the Examiner's rejection of claim 7 under 35 U.S.C. 102 (e) as being anticipated by Conner et al. (Pub. No. US 2004/0135537) must be withdrawn.

The Examiner rejected claims 4, 5, and 8 under 35 U.S.C. 103 (a) as being unpatentable over Conner et al. (Pub. No. US 2004/0135537) in view of Wallach et al. (US 6,925,679). According to the Examiner, with respect to claim 4, Conner et al. discloses a microprocessor which is pre-programmed to follow a predetermined characteristic. Further

according to the Examiner, based upon the movement from the user, either urging the vacuum cleaner forward or in reverse, the microprocessor detects the signal and moves the vacuum cleaner accordingly (Page 5-6, paragraphs 59-60). In regards to claim 8, according to the Examiner, Conner et al. discloses a programmable microprocessor with an H-bridge controller to control the response of the propulsion drive motor based upon signal from the microprocessor. (Page 5, paragraph 55). Further, according to the Examiner, Conner et al. does fail to disclose using pulse width to modulate the voltage applied to the propulsion drive motor based upon the position of the handle. According to the Examiner, Wallach et al. discloses an autonomous vacuum cleaner that uses pulse width to modulate the power to enable the drive mechanism of the vacuum cleaner to be able to work at a variety of speeds (Column 6, lines 38-40). The Examiner reasons it would have been obvious to one having ordinary skill in the art at the time of the invention to use pulse width modulation in order to be able to provide a variety of different speeds for the user, which would make the use of the vacuum cleaner more desirable. However, with all due respect to the Examiner, there is no teaching or suggestion of in either of the references of using a programmable microprocessor to pulse width modulate the voltage applied to the propulsion drive motor to follow a pre-determined characteristic to make the use of the vacuum cleaner more desirable as is required for a rejection under 35 U.S.C. 103(a). Further, as discussed previously, Conner et al. does not discloses an H-bridge controller as the Examiner has stated. An H-bridge controller in combination with a microprocessor or otherwise would not provide the neccesary voltage to energize a brushless DC motor. Thus, for at least these reasons, the rejection of claims 4, 5 and 8 must be withdrawn.

In regards to claims 5 and 8, it is inherent that the pre-determined characteristics of the microprocessor must be based upon a mathematical algorithm. In order to be able to provide the pulse width modulation, it must come from a mathematical algorithm. However, with all due respect to the Examiner, it is not inherent that the pre-determined characteristics of the microprocessor must be based upon a mathematical algorithm. Pulse width modulation can be achieved electronically through many known methods including but not limited to mathematical algorithms, zero-cross detectors and data look up tables.

The Examiner rejected claim 6 under 35 U.S.C. 1 03(a) as being unpatentable over Wallach et al. (US 6,925,679) as applied to claim 4 above, and further in view of Elliott et al. (US 6,313,597). According to the Examiner, both Conner et al. and Wallach fail to disclose the use of a table of values for the pre-determined characteristics. According to the Examiner, Elliot et al. discloses the use of a table of values for a microprocessor in a cleaning apparatus. Further, according to the Examiner, Elliot et al. discusses having a controller that may be operable in a variety of energization in steps between different values. Even further, according to the Examiner, Elliot et al. states that the data is stored in a look-up table (Column 2, lines 46-48) and Elliot et al. also discusses the need of a look-up table or another particularly cost-effective embodiment (Column 5, lines 32-41). The Examiner reasons it would have been obvious to one having ordinary skill in the art at the time of the invention to use a look-up table for the values instead of performing the mathematical algorithm every time in order to reduce the amount of clock cycles, or time, that it takes to retrieve the needed data.

However, with all due respect to the Examiner, there is no teaching or suggestion in

either of the references for the combination proposed by the Examiner as is required for a rejection under 35 U.S.C. 103(a). The purpose of the data stored in the look up table in Elliot et al. is completely different than the purpose of the data stored in the look up table in the instant invention. First, the data in the look up table in Elliot et al. is used to control a switched reluctance motor rotating the fan for creating cleaning suction. In contrast, the data in the look up table in the instant invention is used to control the energization of a brushed propulsion drive motor based upon input from the hall effect sensor and magnets located in the cleaner handle. The data in the look up table in the microprocessor is selected to provide a desirable response characteristic of the propulsion drive motor based upon the movement of the handle which moves the hall effect sensor relative to the magnets. The response characteristic can be chosen in this manner to give a different feel and response to the user as the cleaner is propelled over the floor surface. Such response characteristics can vary from soft start to hard start, slow start to fast start, or any one of an infinite possibilities with infinite response characteristics in between the stopping and starting of the propulsion drive motor. The data in the look up table in Elliot et al. is used to signify two energization levels of the fan motor only with the energization level between the two levels being controlled by a predetermined mathematical algorithm. In this manner, the energization level may be varied smoothly as function of the measured rotor speed (col. 3, lines 1-36). In addition, the use of the look up table in the instant invention was not done to eliminate the use of a mathematical algorithm in order to reduce the amount of clock cycles or time needed to retrieve the needed data as was done in Elliot et al. Thus, for at least these reasons, the rejection of claim 6 under 35 U.S.C. 103(a) must be withdrawn.

The Examiner rejected claims 10-12 under 35 U.S.C. 103(a) as being unpatentable over Conner et al. (Pub. No. US 2004/0135537) in view of Abramson et al. (Pub. No. US 2003/0060928). According to the Examiner, in regards to claim 10, Conner et al. discloses a programmable control arrangement for a self-propelled floor care appliance, comprising: a self-propelled floor care appliance having a propulsion means for propelling the floor care appliance over a surface to be cleaned (Page 2, paragraph 33), a programmable microprocessor to receive the output from a hall effect sensor for outputting a signal according to pre-programmed logic (Page 5, paragraph 57), a controller for receiving the signal and providing a voltage to a propulsion means at a corresponding voltage and polarity (Page 5, paragraph 60). Further, according to the Examiner, Conner et al. fails to disclose a hall effect sensor that is positioned in an operative relationship with a wheel located on the main body of the floor care appliance to sense the desired direction from claim 10. Yet even further, according to the Examiner, Abramson et al. discloses the use of hall effect, or magnetic field, sensors in an operative relationship with a wheel in a robotic vacuum cleaner and teaches the use of the hall effect sensors on the wheels it control the navigation system of the vacuum cleaner. (Page 7, paragraphs 98-100). The Examiner reasons it would have been obvious to one having ordinary skill in the art at the time of the invention to include a hall effect sensor in an operative relationship with a wheel in order to be able to sense the desired direction of the floor care appliance from the user and also to still be able to sense the speed and provide a corresponding output. However, with all due respect to the Examiner, there is no teaching or suggestion of the combination proposed by the Examiner in the cited references as is required for a rejection under 35 U.S.C. 103(a). Further, the hall effect sensors in Abramson

et al. perform a different function than the hall effect sensors in the instant invention. The hall effect sensors in Abramson et al. serve to detect only displacement information of the cleaner by counting the number of pulses of induced by the traveling magnets. This displacement information is fed to a navigational computer to control the movement of the cleaner (Page 7, paragraphs 0098-0100). In contrast, the hall effect sensors in the instant invention are used to detect the movement of the cleaner when the user pushes or pulls the cleaner handle to drive and control the speed of the propulsion motor. Thus, for at least these reasons, the rejection of claim 10 under 35 U.S.C. 103(a) must be withdrawn.

In regards to claim 11, according to the Examiner, Conner et al. discloses a hall effect sensor outputting a voltage of varying value based upon the readings from the hall effect sensor. (Page 5, paragraph 59). Also, according to the Examiner Conner et al. fails to disclose the hall effect sensor outputting a voltage of varying value based upon the rotation of a series of magnets positioned circumferentially on the wheel past the hall effect sensor. Yet even further, according to the Examiner, Abramson et al. discusses the hall effect sensors sending signals to the control system when being rotated about the wheel. The Examiner reasons that it would have been obvious to one having ordinary skill in the art at the time of the invention to have the hall effect sensors output voltages of varying value based on their position so as to be able to send signals to a controller. However, with all due respect to the Examiner, there is no teaching or suggestion of the combination proposed by the Examiner in the cited references as is required for a rejection under 35 U.S.C. 103(a). In addition, applicant submits that this rejection is moot since it depends from base claim 10, which for

at least the reasons set forth above, is allowable.

In regards to claim 12, according to the Examiner, Conner et al. discloses a user pushing or pulling a handle located on the distal end of the floor care appliance (Pages 5-6, paragraphs 59-60). Further, according to the Examiner, Conner et al. also fails to disclose using a wheel to rotate when the user pushes or pulls on a handle. Even further, according to the Examiner, Conner et al. discloses using two support structures sliding past one another to detect the desired speed from the user. The Examiner reasons it would have been obvious to one having ordinary skill in the art at the time of the invention to use the wheel of Abramson et al. in order to be able to sense the desired direction and also speed of the floor care appliance from the user. However, with all due respect to the Examiner, there is no teaching or suggestion of the combination proposed by the Examiner in the cited references as is required for a rejection under 35 U.S.C. 103(a). In addition, applicant submits that this rejection is moot since it depends from base claim 10, which for at least the reasons set forth above, is allowable.

Claims 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Abramson et al. (Pub. No. US 2003/0060928) as applied to claim 11 above, and further in view of Wallach et al. (US 6,952,679). According to the Examiner, both Conner et al. and Abramson et al. fail to disclose the use of pulse width modulation to control the voltage applied to the propulsion drive motor. Even further, according to the Examiner, Wallach et al. discloses an autonomous vacuum cleaner that uses pulse width to modulate the power to enable the drive mechanism of the vacuum cleaner to be able to work at a variety of speeds.

(Column 6, lines 38-40). The Examiner reasons it would have been obvious to one having ordinary skill in the art at the time of the invention to use pulse width modulation in order to be able to provide a variety of different speeds for the user, which would make the use of the vacuum cleaner more desirable. However, with all due respect to the Examiner, there is no teaching or suggestion of the combination proposed by the Examiner in the cited references as is required for a rejection under 35 U.S.C. 103(a). In addition, applicant submits that this rejection is moot since claims 13 and 14 depend from base claim 10, as applied to claim 11, which for at least the reasons set forth above, is allowable.

In regards to claim 14, according to the Examiner, it is inherent that the pre-determined characteristics of the microprocessor must be based upon a mathematical algorithm. Even further, according to the Examiner, in order to be able to provide the pulse width modulation, it must come from a mathematical algorithm. As discussed previously, it is not inherent that the pre-determined characteristics of the microprocessor must be based upon a mathematical algorithm. Pulse width modulation can be achieved electronically through many known methods including but not limited to mathematical algorithms, zero-cross detectors and data look up tables.

Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wallach et al. (US 6,925,679) as applied to claim 13 above, and further in view of Elliot et al. (US 6,313,597). According to the Examiner, Conner et al., Abramson et al. and Wallach et al. fail to disclose the use of a table of values for the pre-determined characteristics. Even further, according to the Examiner, Elliot et al. discloses the use of a table of values for a

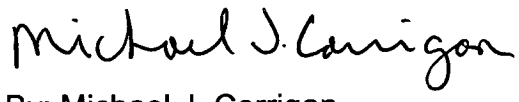
microprocessor in a cleaning apparatus. Yet even further, according to the Examiner, Elliot et al. discusses having a controller that may be operable in a variety of energization in steps between different values. Still yet even further, according to the Examiner, Elliot et al. states that the data is stored in a look-up table. (Column 2, lines 46-48) and discusses the need of a look-up table or another particularly cost-effective embodiment (Column 5, lines 32-41). The Examiner reasons it would have been obvious to one having ordinary skill in the art at the time of the invention to use a look-up table for the values instead of performing the mathematical algorithm every time in order to reduce the amount of clock cycles, or time, that it takes to retrieve the needed data. However, with all due respect to the Examiner, there is no teaching or suggestion of the combination proposed by the Examiner in the cited references as is required for a rejection under 35 U.S.C. 103(a). As discussed previously, the purpose of the data look up tables in Elliot et al. is completely different than in the instant invention. The data look up table in Elliot et al. controls the energization of the motor rotating the fan used for creating cleaning suction not the propulsion drive motor as in the instant invention. Further, in the instant invention the data in the look up table in the microprocessor is selected to provide a desirable response characteristic of the propulsion drive motor based upon the movement of the handle which moves the hall effect sensor relative to the magnets. The response characteristic can be chosen in this manner to give a different feel and response to the user as the cleaner is propelled over the floor surface. Such response characteristics can vary from soft start to hard start, slow start to fast start, or any one of an infinite possibilities with infinite response characteristics in between the stopping and starting of the propulsion drive motor. The data in the look up table in Elliot et al. is used to signify two energization

levels of the fan motor only with the energization level between the two levels being controlled by a predetermined mathematical algorithm. In this manner, the energization level may be varied smoothly as function of the measured rotor speed (col. 3, lines 1-36). In addition, the use of the look up table in the instant invention was not done to eliminate the use of a mathematical algorithm in order to reduce the amount of clock cycles or time needed to retrieve the needed data as was done in Elliot et al. In addition, applicant submits that this rejection is moot since claim 15 depends from base claim 10, as applied to claim 13, which for at least the reasons set forth above, is allowable.

It is believed that above arguments and amendment places the present application in condition for allowance. Therefore, it is respectfully requested that this application be examined and an appropriate Office action be issued.

RESPECTFULLY SUBMITTED,

TONDRA



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INVENTOR: Tondra et al.
TITLE: Control Arrangement For A Self Propelled Floor Care Appliance
SERIAL NO. 10/677,999

ANNOTATED MARKED UP DRAWING

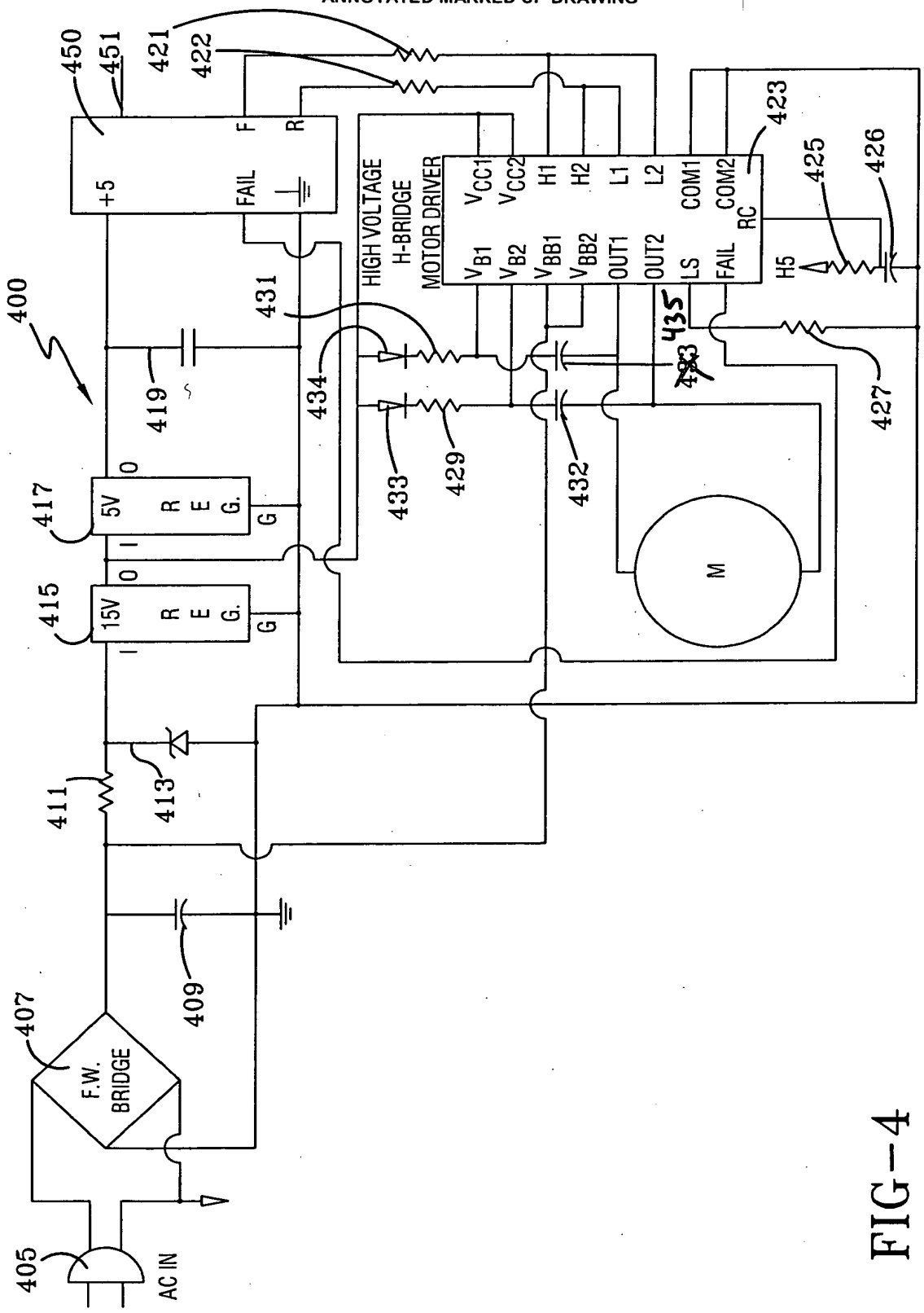

FIG-4